



# **Paradigm Shift: Virtual Power Purchase Agreements in 2018**

**Alan Claus Anderson**

Energy Department Vice-Chair, Polsinelli PC

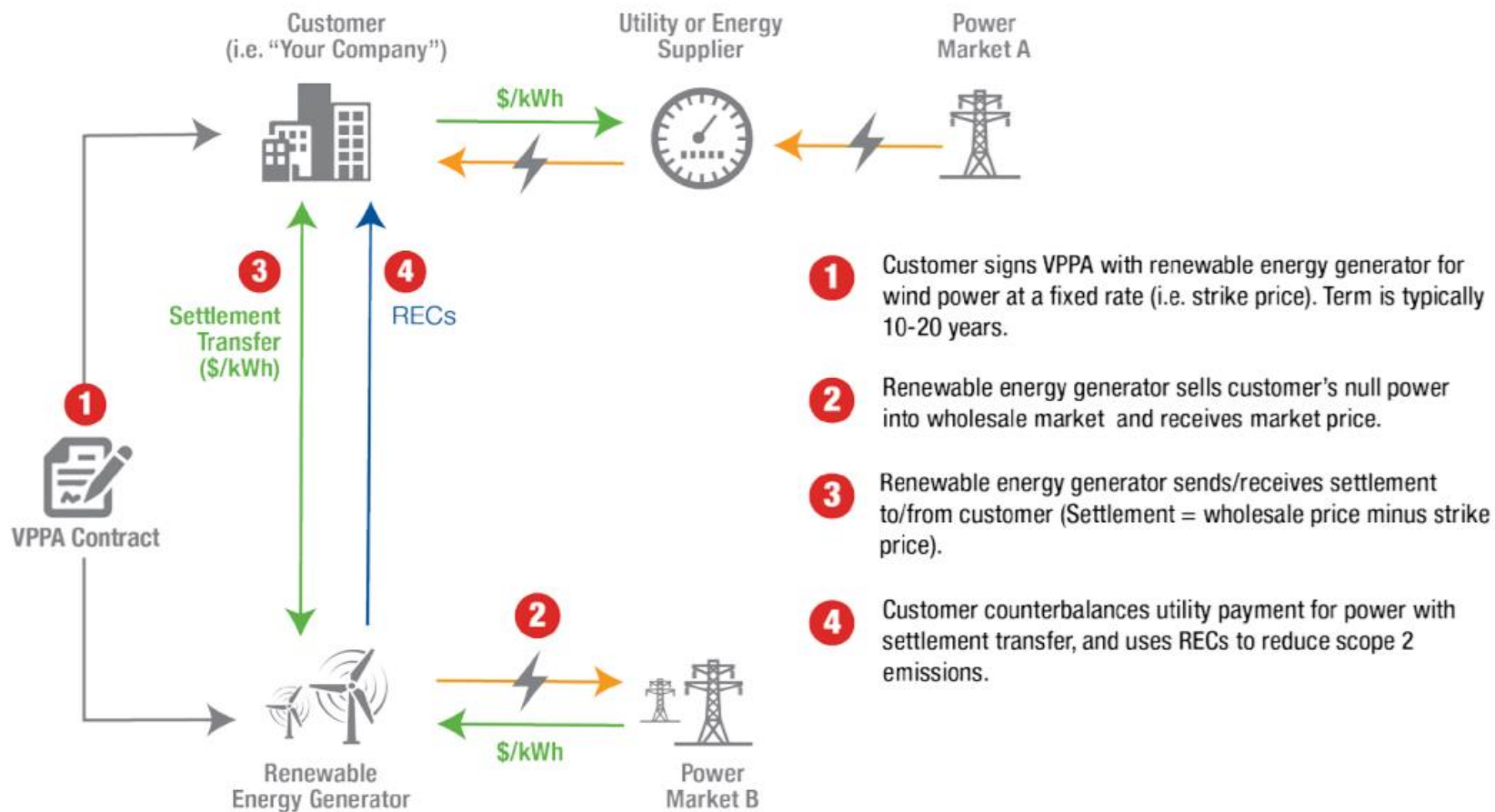
**Kansas Energy Conference**

October 11, 2018

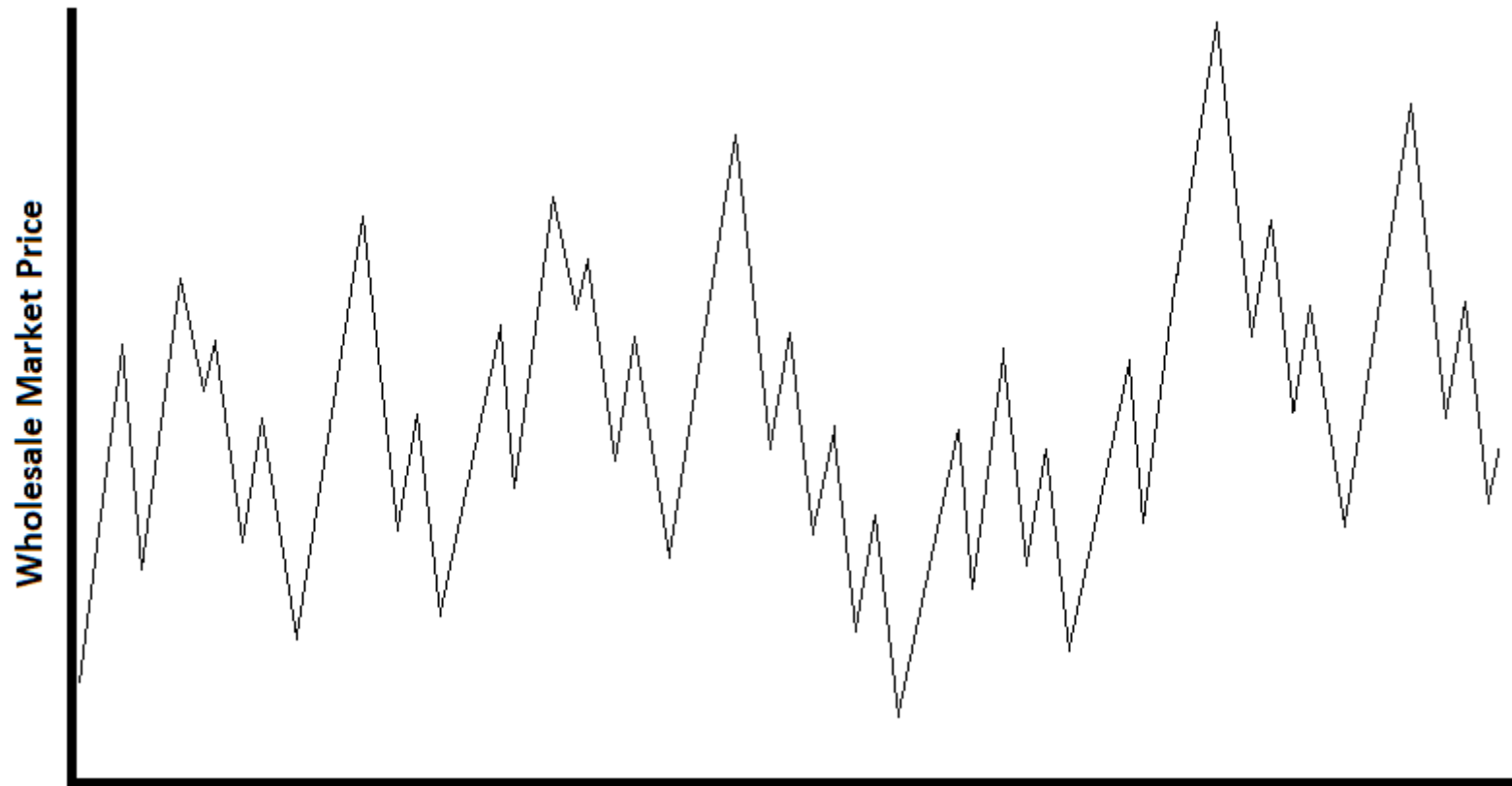
# What is a Virtual PPA?

- Long-term financial contract to purchase energy from a specific project.
- Physical energy does not go directly to Buyer, who still gets direct power from the utility.
- Energy is sold into the wholesale market, at the fluctuating Market Price.
- Buyer and Seller set a Strike Price, and difference between Market Price and Strike Price is trued-up at regular intervals.
  - If Market Price is more than Strike Price, Seller pays.
  - If Strike Price is more than Market Price, Buyer pays.

# What is a Virtual PPA?



# VPPA True-Up



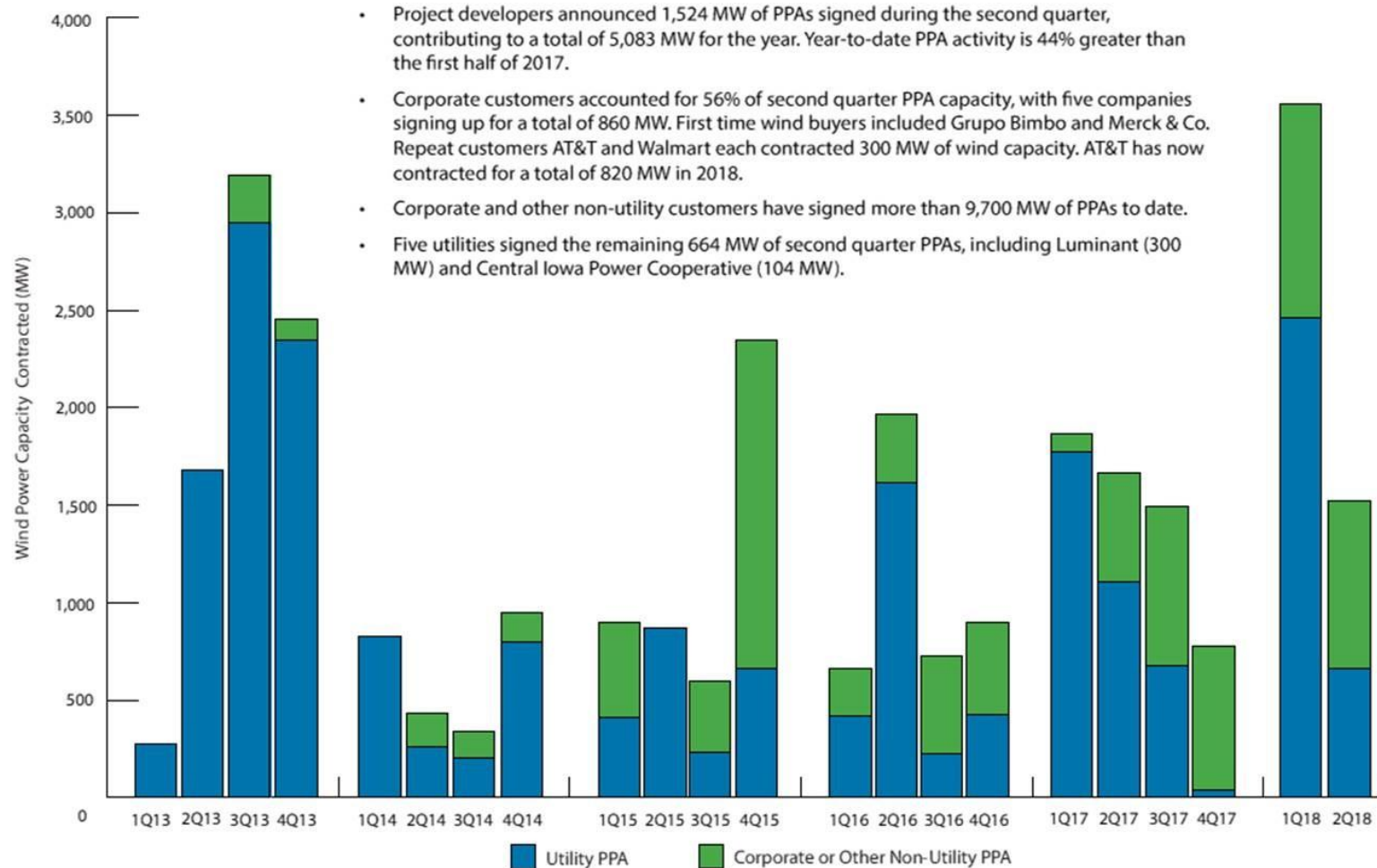
# VPPA True-Up



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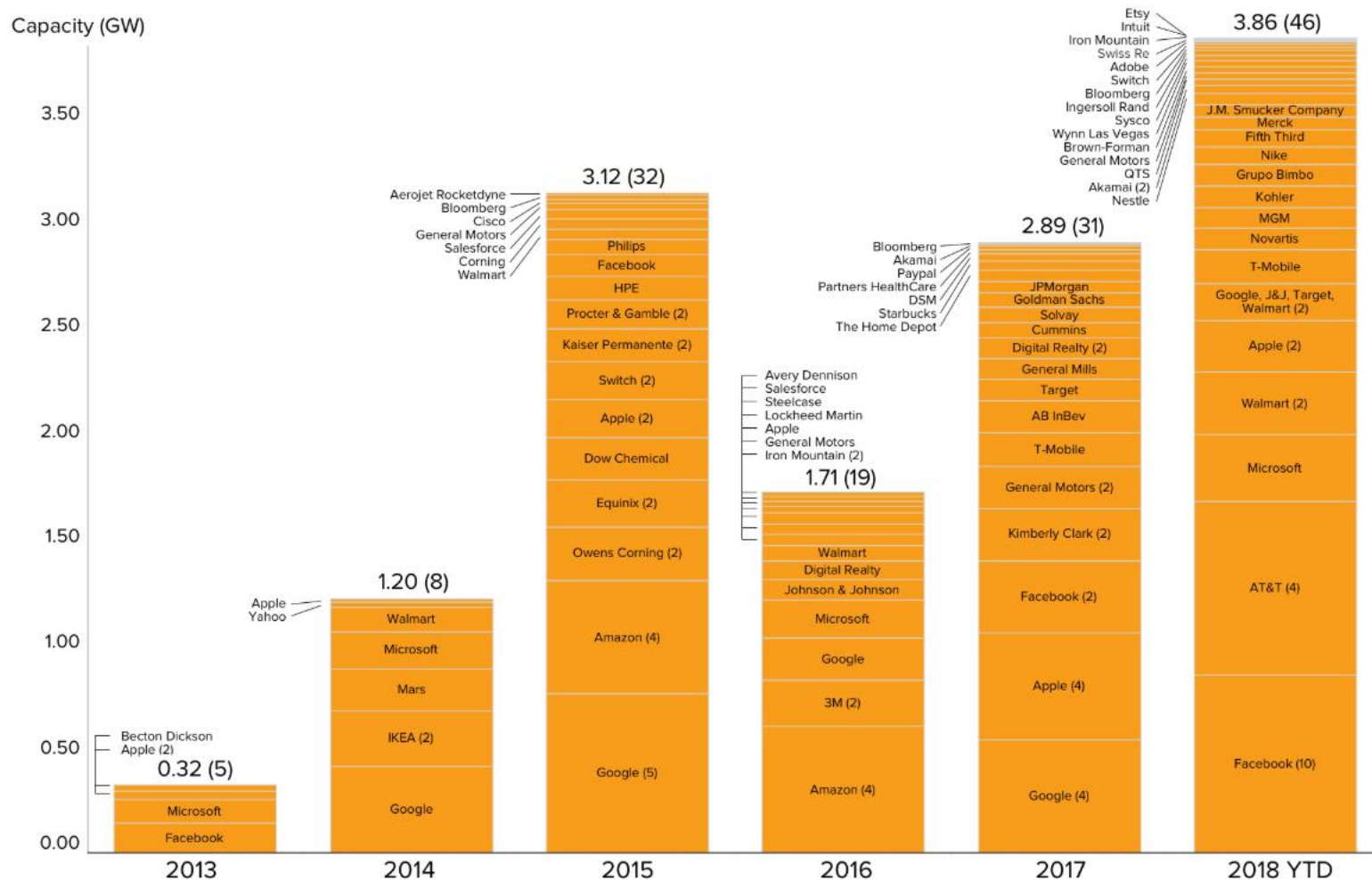


# PPA Market Expansion





# Corporate Buyers

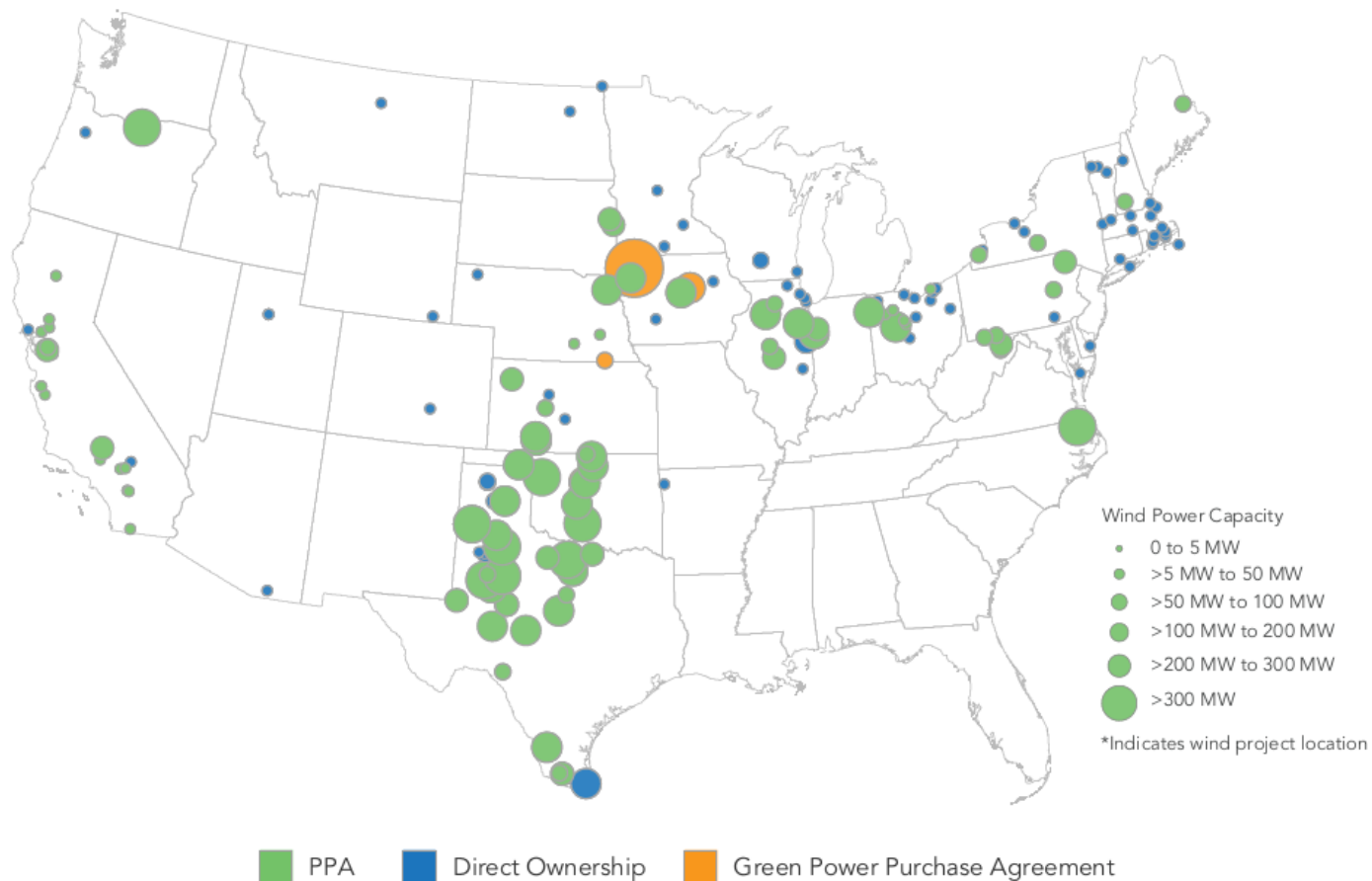


As of August 6, 2018. Publicly announced contracted capacity of corporate Power Purchase Agreements, Green Power Purchases, Green Tariffs, and Outright Project Ownership in the US, 2013 – 2018 YTD. Excludes on-site generation (e.g., rooftop solar PV) and deals with operating plants. (#) indicates number of deals each year by individual companies.

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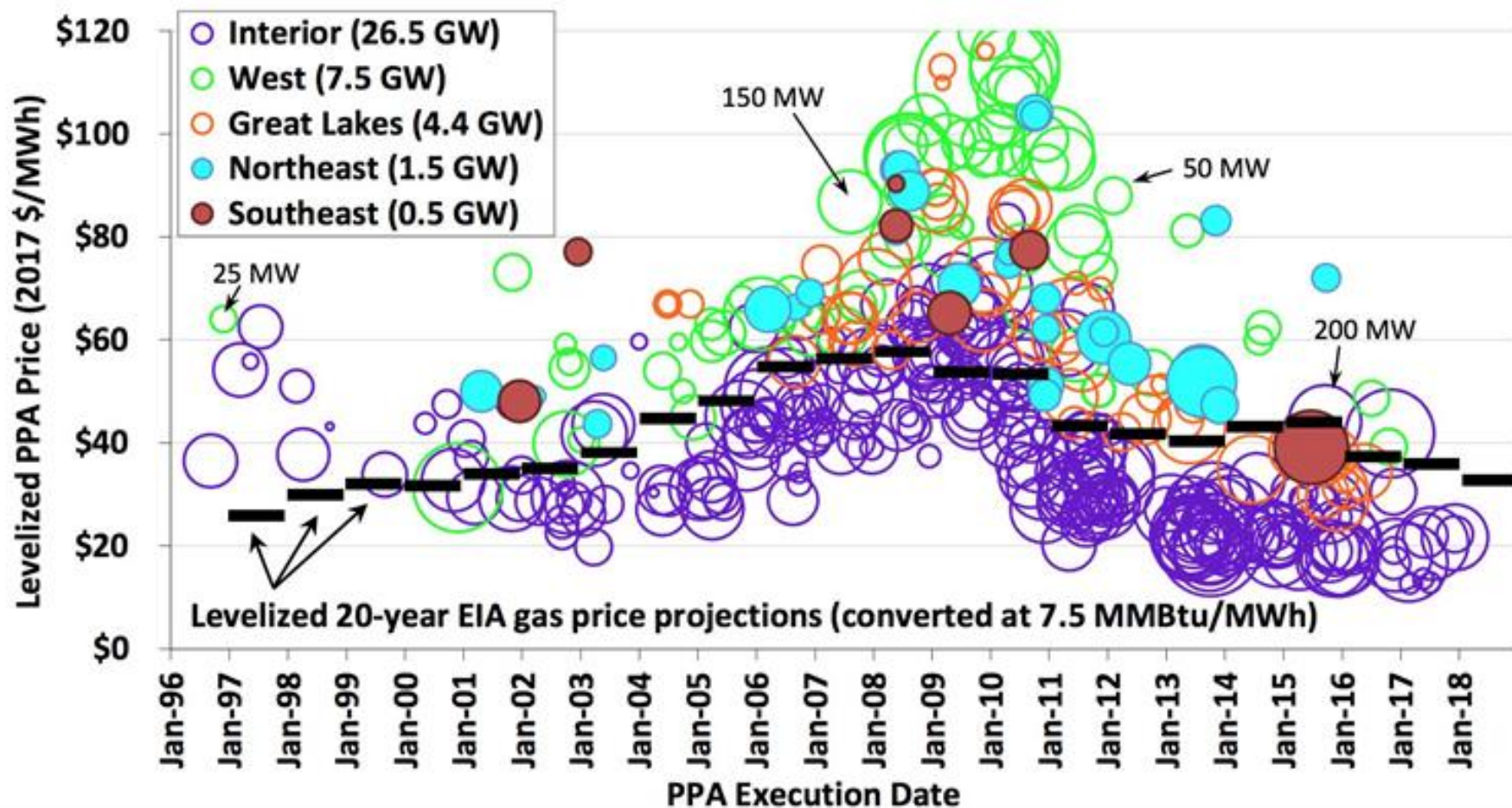


# 2017 Power Purchases

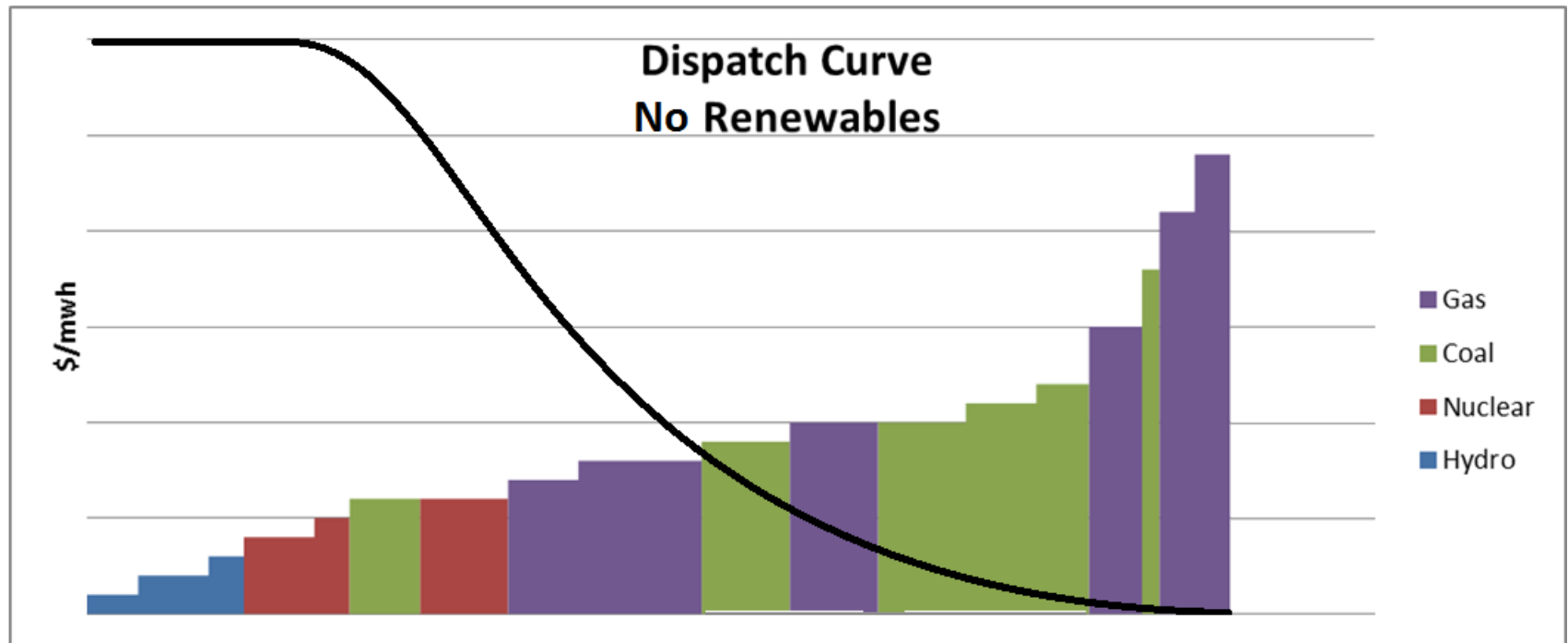


Note: Data include publicly announced physical and virtual power purchase agreements (PPA), direct ownership of onsite or offsite wind projects, and large-scale REC purchases associated with specific wind projects. Data is recorded at the time of announcement and does not indicate when the associated wind project is placed into operation.

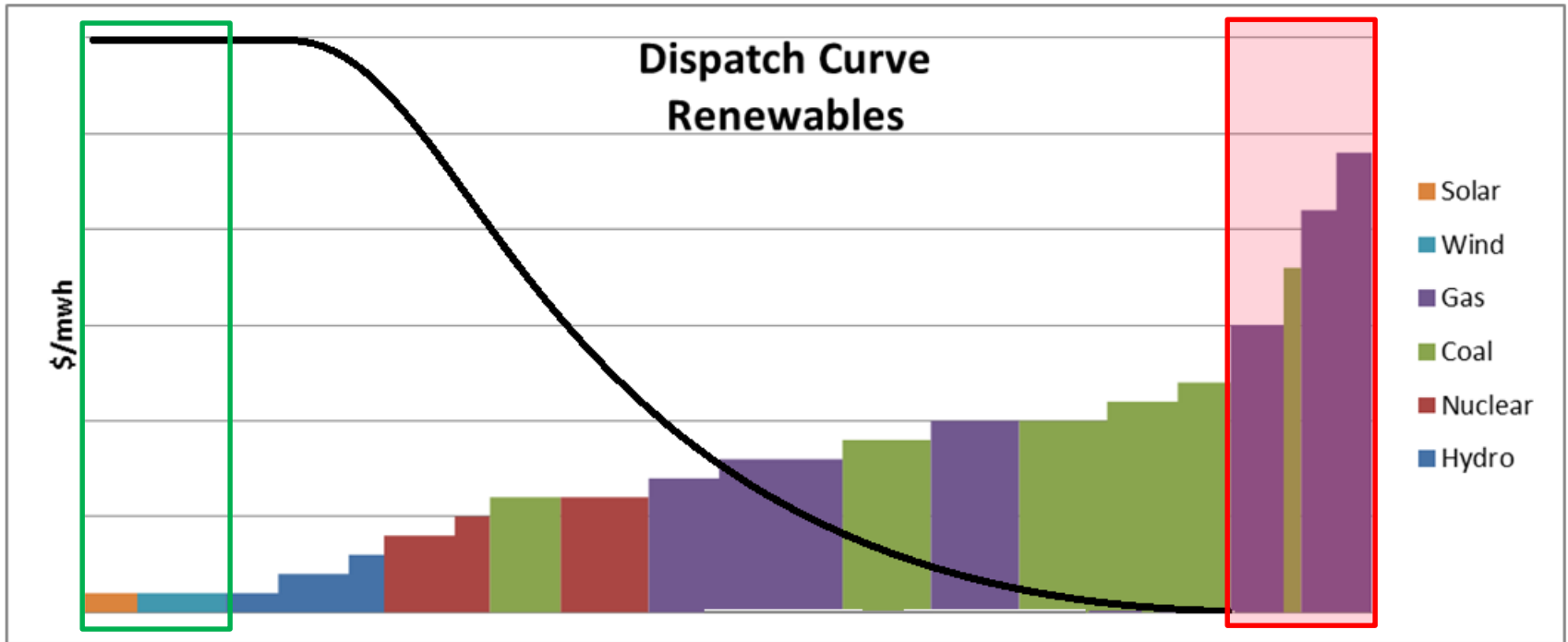
# Impacts: Declining PPA Prices



# Impacts: Generation Mix



# Impacts: Generation Mix





# Key VPPA Contract Terms

- Strike Price
- Power must be sold into an appropriate market.
  - Active, highly liquid energy markets are needed.
- Risk Allocations:
  - Market Price Risk – Negative pricing.
  - Seller's Project Risk
  - Credit Risk for Buyer and Seller
  - Change of Law Risk
- Dodd-Frank Issues – Derivative Swap Regulations



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